SUMMATIVE ASSESSMENT - II
March 2015

Marking Scheme – Science (Outside Delhi) 31/1

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. It carries only suggested value points for the answer. <u>These are only guidelines and do not constitute the complete answer</u>. Any other individual response with suitable justification should also be accepted even if there is no reference to the text.

2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed.

3. If a question has parts, please <u>award marks in the right hand side for each part</u>. Marks awarded for different parts of the question should then be totalled up and written in the left hand margin.

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5. If a candidate has attempted an extra question, <u>marks obtained in the question attempted first should be retained</u> and the other answer should be scored out.

6. Wherever only two/three of a 'given' number of examples/factors/points are expected only the first two/three or expected number should be read. The rest are irrelevant and should not be examined.

7. There should be <u>no effort at 'moderation' of the marks</u> by the evaluating teachers. The actual total marks obtained by the candidate may be of no concern of the evaluators.

8. All the Head Examiners / Examiners are instructed that while evaluating the answer scripts, if the answer is found to be totally incorrect, the (X) should be marked on the incorrect answer and awarded '0' marks.

9. ½ mark may be deducted if a candidate either does not write units or writes wrong units in the final answer of a numerical problem.

10. A full scale of mark 0 to 100 has to be used. <u>Please do not hesitate to award full marks if the answer deserves it</u>.

11. As per orders of the Hon'ble Supreme Court the candidates would now be permitted to obtain photocopy of the Answer Book on request on payment of the prescribed fee. All Examiners/Head Examiners are once again reminded that they must <u>ensure that evaluation is carried out strictly as per value points </u>given in the marking scheme.

	Expected Answer/ Value point **SECTION – A**	Marks	Total
Q1.	Seven	1	1
Q2.	Reproduction	1	1
Q3.	1000 J	1	1

Q4.

i) $n_g = \dfrac{4}{3}$; $n_w = \dfrac{3}{2}$; $v_g = 2 \times 10^8 \, \text{m/s}$

$n_g = \dfrac{c}{v_g}$ ½

$\therefore c = n_g v_g = \dfrac{4}{3} \times 2 \times 10^8 \, \text{m/s} = 2.67 \times 10^8 \, \text{m/s}$ ½

ii) $n_w = \dfrac{c}{v_w}$

$\therefore v_w = \dfrac{c}{n_w} = \dfrac{2.67 \times 2 \times 10^8}{3} = 1.78 \times 10^8 \, \text{m/s}$ 1   2

Note: Full marks to be awarded for those who attempt with the correct values of refractive indices.

Q5.

Causes: Disposal of industrial effluents

Human activities like bathing, washing, immersion of ashes, etc.

Disposal of untreated sewage   ½, ½

(any two)

Harmful effects on health – Spreads water borne diseases,

- Consumptions of contaminated fishes

(or any other relevant affect)   ½, ½   2

Q6.

Biodiversity - number and range of variety of species of life forms in an area   1

Effect – loss of diversity may lead to a loss of ecological stability   1   2

Q7.

- Test 1 (Litmus Test)   ½

Take two strips of blue litmus paper. Place a drop each of the alcohol and carboxylic acid on these strips separately. The blue litmus paper turns red in the case of carboxylic acid and remains unaffected in the case of alcohol.   1

- Test 2 (Sodium hydrogen carbonate test / sodium carbonate test)   ½

A pinch of sodium hydrogen carbonate or sodium carbonate is added, to both separately. If brisk effervescence with the evolution of a colorless gas is   1

observed, it indicates the presence of carboxylic acid.

If no change is observed then it confirms the presence of the alcohol.

- Test 3 – Ester test or any other suitable test **(any two)**   3

Q8.

$$H : C \, {:}{:}\, C : H$$
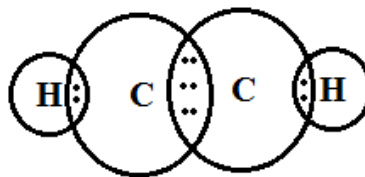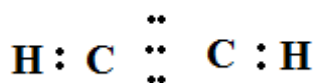
In pure oxygen, ethyne undergoes complete combustion and high temperature suitable for welding is attained.	1
Whereas air contains less percentage /amount of oxygen which results in incomplete combustion of ethyne and the temperature required for welding is not attained.	1 3

Q9.

Property	P	Q		
(a)	No. of electrons in the atom	3 11 19	4 12 20	
			(any one pair)	½
(b)	Size of the atom	Bigger	Smaller	½
(c)	Metallic character	More metallic	Less metallic	½
(d)	Tendency to lose electrons	More	Less	½
(e)	Formula of oxides	P_2O	QO	½
(f)	Formula of chlorides	PCl	QCl_2	½ 3

*Note***:** For parts (e) and (f) examples using symbols of elements may also be accepted.

Q10.

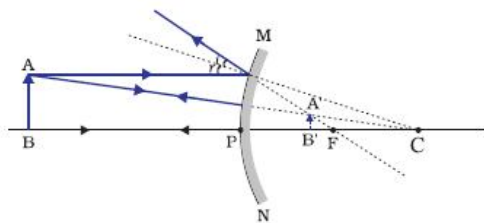|		
Electronic configuration of element with atomic no. 16 is 2,8,6.	1	
Since it has 3 shells, the period no. will be 3.	½	
Since the no. of valence electrons is 6, the group no. will be 10 + 6 = 16.	½	
Valency of the element will be 8- valence electrons ie 8 – 6 = 2.	1	3

Q11.

Characteristics:
Two parents are involved,
Two dissimilar gametes are formed, gamete formation involves meiosis,
Variations are produced,
Occurs in all the higher and some of the lower organisms,
Fertilization / fusion of gametes leading to zygote formation
Slow.

                                                                                ½ x 6   3

Q12.	Chromosomes – thread like structures made up of DNA found in the nucleus.	1	
	The original number of chromosomes becomes half during gamete formation.		
	Hence, when the gametes combine, the original number of chromosomes gets restored in the progeny. (or same thing explained in the form of a flow chart).	1,1	3
Q13.	Significance – prevent STDs, Advantage of small family, Less mortality among new borns, Reduces the cases of maternal mortality.	½ x 4	
	Areas which have improved – Family Planning, - Decrease in STD cases (any other)	½ x 2	3
Q14.	Homologous organs – study of homologous organs suggests that the organs having same structure but performing different functions have evolved from a common ancestor.	½	
	Ex. - forelimbs of a frog, lizard, bird and man.	½	
	Analogous organs – show adoption of organs for common use.	½	
	Ex. – wings of butterfly and wings of bat.	½	
	Fossils – provide the missing links between two species.	½	
	Ex. – Archeopteryx / fossils of some dinosaurs with feathers.	½	3
Q15.	• Speciation – evolution of a new species from pre-existing species • Occurring due to accumulation of variations • By processes like genetic drift / geographical barriers like mountains, rivers etc., leading to incapability to reproduce amongst themselves in the population.	½ × 3	
	Natural selection – • Change in frequency of some genes in a population • Which give survival advantage to a species from elimination. • Ex. – in a population of beetles, a new variation (green colour) get survival benefit / advantage to green beetles whereas other (red) perishes.	½ × 3	3

Q16.	Convex mirror	½	
		1	
	Use: As rear view mirror in vehicles/ Also in Malls, Hotels, Airports for security reasons.	½	
	Why: • Forms erect image,	½	
	• Wider field of view.	½	3
Q17.	(i) Scattering – Phenomenon of spreading of light (diffused reflected light) caused by minute particles (dust, smoke etc.) in the atmosphere.	1	
	(ii) Sky appears blue because blue color of sunlight scatters more strongly (due to shorter wavelength) than the red color by the fine particles in the air.		
	OR		
	At sunrise the blue color of sunlight get scattered due to smaller wave length while passing through the thicker layers of the atmosphere. The red component (due to longer wavelength) reaches us, giving red appearance, of the Sun.	2	3
	Note: If explained by following diagram (fully labeled) give full credit.		
Q18.	Biodegradable substances – can be broken down into simpler substances by nature / decomposers/ bacteria/ saprophytes/ saprobionts.	½	
	Ex. – Human Excreta/ Vegetable peels, etc. (any one)	½	
	Non-biodegradable substances – can't be broken down into simpler substances by nature / decomposers.	½	
	Ex. – Plastic/ glass (or any other) (any one)	½	
	Habits:		
	- Use of separate dustbins for biodegradable and non biodegradable waste,		
	- Reuse of things such as poly-bags, etc.,		
	- Recycle of waste		
	- Use of cotton /jute bags for carrying vegetables etc.		
	(any two)	½ x 2	3

Q19.	• Soaps are sodium or potassium salts of long chain carboxylic acids.	½	
	• Detergents are ammonium or sulphonate salts.	½	
	• Cleansing action of soap – One part of soap molecule is ionic / hydrophilic and dissolves in water. The other part is non-ionic / carbon chain / hydrophobic part which dissolves in oil.	1	
	• Thus soap molecules arrange themselves in the form of a micelle / diagram of a micelle.	½	
	On rinsing with water, soap is washed off, lifting the oily dirt particles with it.	½	
	Soap does not form lather in hard water because of the reaction of soap with Ca and Mg ions present in hard water which forms insoluble ppt. / scum.	1	
	Problems due to the use of detergents are:		
	• Detergents are non-biodegradable.		
	• It leads to water or soil pollution.		
	• It can also cause skin problems. **(any two)**	½ x2	5

Q20.	a) Testis – secrete male hormone – testosterone	1	
	Functions – i) formation of sperms, ii) development of secondary sexual characters.	½ x 2	
	b) i) fallopian tube / /oviduct.		
	ii) uterus.	½ x 2	
	• Placenta is a special disc like tissue embedded in the mother's uterine wall and connected to the foetus / embryo.	1	
	• Placenta provides a large surface area for glucose and oxygen/ nutrients to pass from the mother's blood to the embryo/ foetus.	1	5

Q21.	a) When Mendel cross pollinated pure tall pea plants with pure dwarf pea plants, only tall plants were obtained in F1 generation. On self pollinating the F1 progeny, both tall and dwarf plants appeared in F2 generation in the ratio 3:1	1	
	Appearance of tall character in both the F1 and F2 shows that it is a dominant character. The absence of dwarf character in F1 generation and its reappearance in F2 shows dwarfness is the recessive character.	1	
	b) When Mendel conducted a dihybrid cross having two sets of characters, he obtained only one set of parental characters in F1 generation whereas in F2 generation he obtained both the set of parental characters now recombined in the ratio of 9:3:3:1.	1 1	
	The appearance of new recombinants in the F2 generation along with parental type shows that traits are inherited independently.	1	
	Or		
	Flow chart with explanation.		5

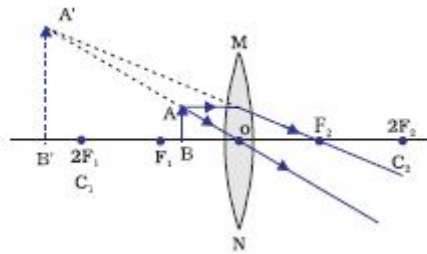|			
Q22.	• Power of lens:- Ability of a lens to converge or diverge the light rays falling on it/ The degree of convergence or divergence of light rays achieved by a lens/ Reciprocal of focal length of the lens.	1	
	• 1 dioptre – It is the power of a lens whose focal length is 1 metre.	½	
	• $f_A = +10 \text{cm} = 0.1 \text{m}$		

Converging/ Convex lens

$$P_A = \frac{1}{f_A} = \frac{1}{+0.1m} = +10D$$

½

½

$$f_B = -10\,cm = -0.1m$$

Diverging/ Concave lens

½
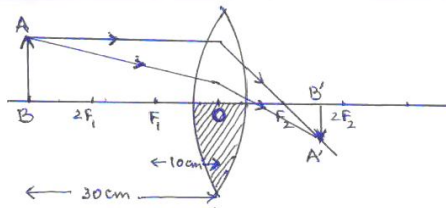
$$P_B = \frac{1}{f_B} = \frac{1}{-0.1m} = -10D$$

½

- In this case the object will be between the optical centre and principal focus of the lens. Hence the convex lens, i.e., lens A will form virtual and magnified image of the object.

½

-

1 | 5

Q23.
- Yes

½

-

(Note: image must be between F_2 and $2F_2$)

1 ½

- $h = 4$ cm $f = +20$ cm $u = -15$ cm $v = ?$ $h' = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

½

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{(+20)} + \frac{1}{(-15)} = \frac{3-4}{60} = \frac{-1}{60}$$

$$\therefore v = -60 \text{ cm}$$

1

Nature – Virtual, erect

½

$$h' = \frac{v}{u} \times h = \frac{-60\,cm}{-15\,cm} \times (+4\,cm) = +16\,cm$$

1 | 5

Note: Problem can be solved through ray diagram also.

Q24.
- Ciliary muscles modify the curvature of the eye lens to enable the eye to focus objects at varying distances/ help in adjusting the focal length of the eye lens

1

- Presbyopia

½

- Bifocal lens

½

(a) Defect – Myopia/ Nearsightedness

½

Corrective lens – Concave/ Diverging lens

½

(b) Values – Concerned, Caring etc. (one value of teacher, one value of Salman)		½, ½	
(c) By thanking the teacher and Salman		1	5

SECTION – B

25) A	26) D	27) A		
28) C	29) B	30) B		
31) D	32) D	33) B	1x9	9

Q34.	• Carbon dioxide / CO_2.	1	
	• Lime Water turns milky when CO_2 is passed through it. / CO_2 extinguishes a burning splinter.	1	2
Q35.	Fine	1	
		1	2
Q36.	• Towards the lens	1	
	• Magnification decreases	1	2

SUMMATIVE ASSESSMENT - II
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Marking Scheme – Science (Outside Delhi) 31/2

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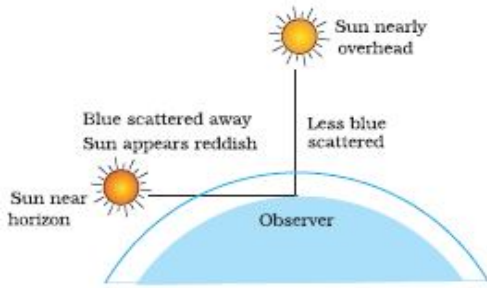
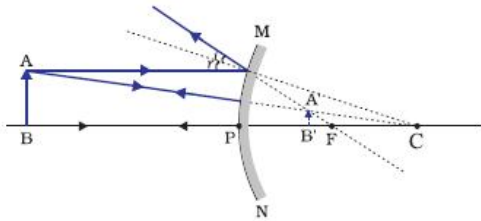|	Expected Answer/ Value point SECTION – A	Marks	Total
Q1.	Ten.	1	1
Q2.	Genes / Chromosomes	1	1
Q3.	Because only plants can utilize the radiant energy of the sun and transform it to chemical form during photosynthesis.	1	1
Q4.	i) $n_g = \dfrac{4}{3}$; $n_w = \dfrac{3}{2}$; $v_g = 2 \times 10^8$ m/s $n_g = \dfrac{c}{v_g}$ $\therefore c = n_g v_g = \dfrac{4}{3} \times 2 \times 10^8$ m/s $= 2.67 \times 10^8$ m/s ii) $n_w = \dfrac{c}{v_w}$ $\therefore v_w = \dfrac{c}{n_w} = \dfrac{2.67 \times 2 \times 10^8}{3} = 1.78 \times 10^8$ m/s *Note:* Full marks to be awarded for those who attempt with the correct values of refractive indices.	½ ½ 1	2
Q5.	Spreading awareness / different ways to make people realize: - a) Organizing street plays, b) Distributing pamphlets to the residents, c) Reuse / recycle of the waste products, d) Calling meeting of residents, welfare society / association of the locality, e) Advertisements through TV / radio, f) Putting posters / hoardings, g) Segregation of the wastes as per the nature of the waste. Or any other (any two)	½ x 4	2
Q6.	Advantages (any two) :- a) Recharges the ground water, b) Prevents evaporation of water, c) Prevents breeding of mosquitoes d) Prevents contamination e) Mitigates flood and drought (or any other relevant point)	1 + 1	2
Q7.	A group of organic compounds having the same functional group and similar structures in which the successive members differ by CH_2 group.	1	

	C_3H_4, C_4H_6, C_5H_8 : Alkynes	½ + ½	
	C_3H_6, C_4H_8, C_5H_{10} : Alkenes	½ + ½	3

Q8.

- Test 1 (Litmus Test) — ½

Take two strips of blue litmus paper. Place a drop each of the alcohol and carboxylic acid on these strips separately. The blue litmus paper turns red in the case of carboxylic acid and remains unaffected in the case of alcohol. — 1

- Test 2 (Sodium hydrogen carbonate test / sodium carbonate test) — ½

A pinch of sodium hydrogen carbonate or sodium carbonate is added, to both separately. If brisk effervescence with the evolution of a colorless gas is observed, it indicates the presence of carboxylic acid.

If no change is observed then it confirms the presence of the alcohol. — 1

- Test 3 – Ester test or any other suitable test   **(any two)**   — 3

Q9.

(a) Group 2, as each element has two valence electrons / two electrons in the outermost shell of the atom. — ½, ½

(b) Be, because Be has the least tendency to lose electrons. — ½, ½

(c) Ca, as Ca has the maximum no. of shells and atomic size increases down the group. — ½, ½ | 3

Q10.

Electronic configuration of element with atomic no. 16 is 2,8,6. — 1
Since it has 3 shells, the period no. will be 3. — ½
Since the no. of valence electrons is 6, the group no. will be $10 + 6 = 16$. — ½
Valency of the element will be 8- valence electrons ie $8 – 6 = 2$. — 1 | 3

Q11.

Sexual reproduction	**Asexual reproduction**
i) Involves two parents – male and female.	i) Involves only one parent.
ii) Involves two parents – male and female.	ii) No gametes are produced
iii) Fertilization / zygote formation is observed.	iii) No fertilization / zygote formation is observed
iv) Meiosis occurs during gamete formation.	iv) Meiosis does not occur at any stage of reproduction.
v) Genetic variation occurs.	v) Genetic variation does not occur.

(any three)   1+1+1 | 3

Q12.

Significance – prevent STDs,
Advantage of small family,
Less mortality among new borns,
Reduces the cases of maternal mortality.   — ½ x 4

	Areas which have improved – Family Planning,
	        - Decrease in STD cases
	                                 (any other)
		½ × 2	3

Q13.	Chromosomes – thread like structures made up of DNA found in the nucleus.	1	
	The original number of chromosomes becomes half during gamete formation.		
	Hence, when the gametes combine, the original number of chromosomes gets restored in the progeny. (or same thing explained in the form of a flow chart).	1,1	3
Q14.	a) F1 generation - blue b) 25% c) BB : Bw = 1:2	1 1 1	3
Q15.	• Speciation – evolution of a new species from pre-existing species • Occurring due to accumulation of variations • By processes like genetic drift / geographical barriers like mountains, rivers etc., leading to incapability to reproduce amongst themselves in the population.	½ × 3	
	Natural selection – • Change in frequency of some genes in a population • Which give survival advantage to a species from elimination. • Ex. – in a population of beetles, a new variation (green colour) get survival benefit / advantage to green beetles whereas other (red) perishes.	½ × 3	3
Q16.	(i) Scattering – Phenomenon of spreading of light (diffused reflected light) caused by minute particles (dust, smoke etc.) in the atmosphere.	1	
	(ii) Sky appears blue because blue color of sunlight scatters more strongly (due to shorter wavelength) than the red color by the fine particles in the air. <center>OR</center> At sunrise the blue color of sunlight get scattered due to smaller wavelength while passing through the thicker layers of the atmosphere. The red component (due to longer wavelength) reaches us, giving red appearance, of the Sun.	2	3
	Note: If explained by following diagram (fully labeled) give full credit.		

Q17.	Convex mirror	½	

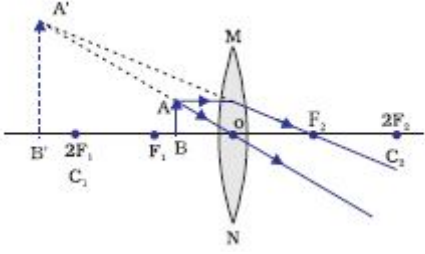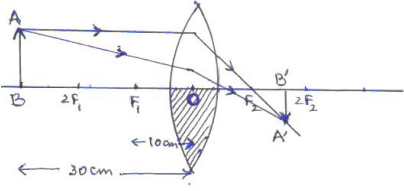|			
		1	
	Use: As rear view mirror in vehicles/ Also in Malls, Hotels, Airports for security reasons.	½	
	Why: • Forms erect image,	½	
	• Wider field of view.	½	3
Q18.	Ecosystem – An ecosystem is defined as a dynamic system of biotic and abiotic components and there is a continuous flow of energy between the different components.	1	
	a) Biotic component / living organisms	½	
	b) Abiotic component / physical factors	½	
	Cleaning of aquarium – because of the,		
	a) absence of natural decomposers	½	
	b) stagnancy of water.	½	3
Q19.	Fossils are preserved remains or impressions of pre-historic organism in the different strata of the earth's crust. Or Fossils are dead remains of animals and plants from remote past.	1	
	Fossils are formed when dead organism are not completely decomposed. The organism may get trapped in resins of tree, lava of volcanoes or hot mud, which when hardens retains the animal's parts thus forming fossils.	1	
	Two methods of determining the age of fossils –		
	a) Relative method – by estimating the age of the layer of earth's crust where the fossil is found. Fossils near the surface are recent and those in the deeper layers are more ancient.	1	
	b) Radio-carbon dating method – by detecting the ratios of different isotopes of carbon in the fossils.	1	

Role of fossils – By determining the age of fossils we come to know the type of earth strata present at that time/ We can also know the type of animals and plants present on the earth at that time/ and also helps in establishing evolutionary relationships by providing connecting links.		5
(any one)	1	

Q20. a) Testis – secrete male hormone – testosterone — 1

Functions – i) formation of sperms,
ii) development of secondary sexual characters. — ½ x 2

b) i) fallopian tube / /oviduct. — ½ x 2
ii) uterus.
- Placenta is a special disc like tissue embedded in the mother's uterine wall and connected to the foetus / embryo. — 1
- Placenta provides a large surface area for glucose and oxygen/ nutrients to pass from the mother's blood to the embryo/ foetus. — 1 | 5

Q21.
- Power of lens:- Ability of a lens to converge or diverge the light rays falling on it/ The degree of convergence or divergence of light rays achieved by a lens/ Reciprocal of focal length of the lens. — 1
- 1 dioptre – It is the power of a lens whose focal length is 1 metre. — ½
- $f_A = +10\,cm = 0.1m$
  Converging/ Convex lens — ½

$$P_A = \frac{1}{f_A} = \frac{1}{+0.1m} = +10D$$ — ½

$f_B = -10\,cm = -0.1m$
Diverging/ Concave lens — ½

$$P_B = \frac{1}{f_B} = \frac{1}{-0.1m} = -10D$$ — ½

- In this case the object will be between the optical centre and principal focus of the lens. Hence the convex lens, i.e., lens A will form virtual and magnified image of the object. — ½

— 1 | 5

Q22.
- Ciliary muscles modify the curvature of the eye lens to enable the eye to focus objects at varying distances/ help in adjusting the focal length of the eye lens — 1
- Presbyopia — ½
- Bifocal lens — ½
- (a) Defect – Myopia/ Nearsightedness — ½
  Corrective lens – Concave/ Diverging lens — ½

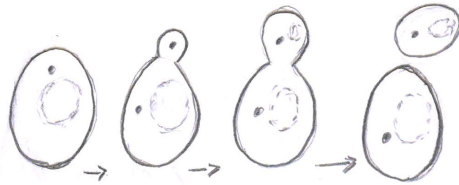(b) Values – Concerned, Caring etc. (one value of teacher, one value of Salman) ½, ½

(c) By thanking the teacher and Salman 1 5

Q23.
- Yes ½
-

(*Note*: image must be between F_2 and $2F_2$) 1 ½

- $h = 4$ cm | $f = +20$ cm $u = -15$ cm $v = ?$ $h' = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$ ½

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u} \Bigg| = \frac{1}{(+20)} + \frac{1}{(-15)} \qquad = \frac{3-4}{60} = \frac{-1}{60}$$

$$\therefore v = -60 \text{ cm}$$ 1

Nature – Virtual, erect ½

$$h' = \frac{v}{u} \times h \quad = \frac{-60 \, \text{cm}}{-15 \, \text{cm}} \times (+4 \, \text{cm}) = +16 \, \text{cm}$$ 1 5

Note: Problem can be solved through ray diagram also.

Q24.
- Soaps are sodium or potassium salts of long chain carboxylic acids. ½
- Detergents are ammonium or sulphonate salts. ½
- Cleansing action of soap – One part of soap molecule is ionic / hydrophilic and dissolves in water. The other part is non-ionic / carbon chain / hydrophobic part which dissolves in oil. 1
- Thus soap molecules arrange themselves in the form of a micelle / diagram of a micelle. ½

On rinsing with water, soap is washed off, lifting the oily dirt particles with it. ½

Soap does not form lather in hard water because of the reaction of soap with Ca and Mg ions present in hard water which forms insoluble ppt. / scum. 1

Problems due to the use of detergents are:
- Detergents are non-biodegradable.
- It leads to water or soil pollution.
- It can also cause skin problems.   (any two) ½ x2 5

SECTION – B

25) B	26) C	27) B
28) D	29) B	30) D
31) D	32) D	33) D

1x9 9

Q34.
- Towards the lens 1
- Magnification decreases 1 2

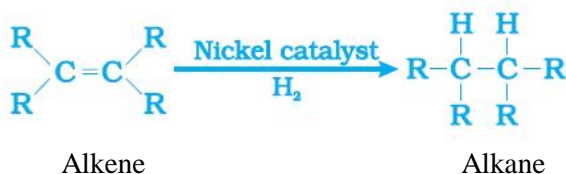|			
Q35.	• Carbon dioxide / CO_2	1	
	• Lime Water turns milky when CO_2 is passed through it. / CO_2 extinguishes a burning splinter.	1	2
Q36.	Fine	1	
		1	2
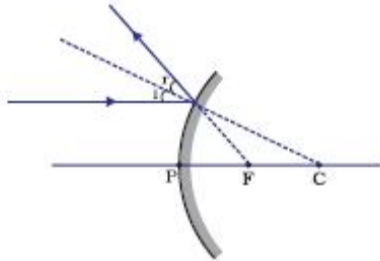
Marking Scheme – Science (Outside Delhi) 31/3

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. It carries only suggested value points for the answer. <u>These are only guidelines and do not constitute the complete answer</u>. Any other individual response with suitable justification should also be accepted even if there is no reference to the text.

2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed.

3. If a question has parts, please <u>award marks in the right hand side for each part</u>. Marks awarded for different parts of the question should then be totalled up and written in the left hand margin.

4. If a question does not have any parts, marks be awarded in the left hand side margin.

5. If a candidate has attempted an extra question, <u>marks obtained in the question attempted first should be retained</u> and the other answer should be scored out.

6. Wherever only two/three of a 'given' number of examples/factors/points are expected only the first two/three or expected number should be read. The rest are irrelevant and should not be examined.

7. There should be <u>no effort at 'moderation' of the marks</u> by the evaluating teachers. The actual total marks obtained by the candidate may be of no concern of the evaluators.

8. All the Head Examiners / Examiners are instructed that while evaluating the answer scripts, if the answer is found to be totally incorrect, the (X) should be marked on the incorrect answer and awarded '0' marks.

9. ½ mark may be deducted if a candidate either does not write units or writes wrong units in the final answer of a numerical problem.

10. A full scale of mark 0 to 100 has to be used. <u>Please do not hesitate to award full marks if the answer deserves it</u>.

11. As per orders of the Hon'ble Supreme Court the candidates would now be permitted to obtain photocopy of the Answer Book on request on payment of the prescribed fee. All Examiners/Head Examiners are once again reminded that they must <u>ensure that evaluation is carried out strictly as per value points </u>given in the marking scheme.

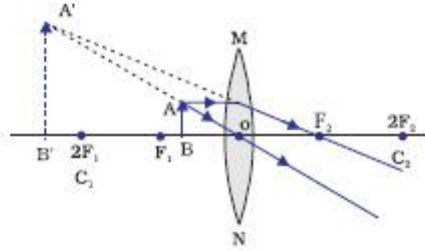|	Expected Answer/ Value point **SECTION – A**	Marks	Total
Q1.	Thirteen	1	1
Q2.	Planaria / hydra / earthworm (any two)	½, ½	1
Q3.	Herbivores	1	1
Q4.			
	Diagram Marking of angles	1 ½ × 2	2
Q5.	Management of natural resources – To sustain the resources for future generation and current basic needs of the population.	1	
	Reuse is a better practice because it can be done at household level with no expense of energy. Reuse does not cause pollution. Eco friendly (any one)	1	2
Q6.	Biodiversity is the range and number of species of living organisms in a given area.	1	
	Two advantages- Maintains ecological balance. Helps in maintaining rainfall. Prevent soil erosion. (any two)	½ , ½	2
Q7.	Alkene, C_nH_{2n} Or Alkyne, C_nH_{2n-2}	½ , ½	
	Presence of Ni / Pd / Pt as catalyst	½	

Alkene   Alkane   ½   ½ , ½

	Or any other hydrogenation reaction.		3
Q8.	• Test 1 (Litmus Test)	½	
	Take two strips of blue litmus paper. Place a drop each of the alcohol and carboxylic acid on these strips separately. The blue litmus paper turns red in the case of carboxylic acid and remains unaffected in the case of alcohol.	1	
	• Test 2 (Sodium hydrogen carbonate test / sodium carbonate test)	½	
	A pinch of sodium hydrogen carbonate or sodium carbonate is added, to both separately. If brisk effervescence with the evolution of a colorless gas is observed, it indicates the presence of carboxylic acid.		
	If no change is observed then it confirms the presence of the alcohol.	1	
	• Test 3 – Ester test or any other suitable test **(any two)**		3
Q9.	a) D, 2, 8, 8, 1	½ , ½	
	b) A and E belong to the same group as both have the same no. of valence electrons / same no. of electrons (2) in the outermost shell.	½ , ½	
	c) A and B / D and E.	½	
	A has a bigger atomic radius than B. or D has a bigger atomic radius than E.	½	3
Q10.	Electronic configuration of element with atomic no. 16 is 2,8,6.	1	
	Since it has 3 shells, the period no. will be 3.	½	
	Since the no. of valence electrons is 6, the group no. will be $10 + 6 = 16$.	½	
	Valency of the element will be 8- valence electrons ie $8 – 6 = 2$.	1	3
Q11.	A – Stigma	1	
	B – Pollen tube	1	
	C – Ovule / germ cell / egg cell	1	3
Q12.	Four categories of contraceptive methods –		
	1. Barrier method (Condoms)		
	2. Surgical method or its name	½ x 4	
	3. Withdrawal method		
	4. Calendar method		
	5. Hormonal method		
	6. IUCD/ Copper T/ Loop		
	(any four)		
	Two advantages –		
	1. Helps in maintaining health of women.		

	2. Helps in preventing STDs especially AIDS 3. Helps in birth control (any two)	½, ½	3
Q13.	Chromosomes – thread like structures made up of DNA found in the nucleus.	1	
	The original number of chromosomes becomes half during gamete formation. Hence, when the gametes combine, the original number of chromosomes gets restored in the progeny. (or same thing explained in the form of a flow chart).	1,1	3
Q14.	• Speciation – evolution of a new species from pre-existing species • Occurring due to accumulation of variations • By processes like genetic drift / geographical barriers like mountains, rivers etc., leading to incapability to reproduce amongst themselves in the population.	½ × 3	
	Natural selection – • Change in frequency of some genes in a population • Which give survival advantage to a species from elimination. • Ex. – in a population of beetles, a new variation (green colour) get survival benefit / advantage to green beetles whereas other (red) perishes.	½ × 3	3
Q15.	Homologous organs – study of homologous organs suggests that the organs having same structure but performing different functions have evolved from a common ancestor.	½	
	Ex. - forelimbs of a frog, lizard, bird and man.	½	
	Analogous organs – show adoption of organs for common use.	½	
	Ex. – wings of butterfly and wings of bat.	½	
	Fossils – provide the missing links between two species.	½	
	Ex. – Archeopteryx / fossils of some dinosaurs with feathers.	½	3
Q16.	The Sun appears reddish at Sunrise as well as at the Sunset and appears white at noon when it is overhead.	1	
	At Sunrise/Sunset the blue light of shorter wave lengths, get scattered away while passing through the thicker layer of air/ large distance through air, and red light of longer wave length reach our eye.	1	
	At noon, the Sun is overhead and the light of the Sun travels relatively shorter distance to our eyes and little of blue and violet colors are scattered, and white light reaches our eye.	1	3
Q17.	• $h = +5$ cm $f = -10$ cm $u = -20$ cm $v = ?$ $h' = ?$ $$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$	½	

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u} \quad = \frac{1}{(-10)} + \frac{1}{(-20)} \quad = \frac{-2-1}{20} \quad = \frac{-3}{20}$$

$$\therefore v = -\frac{20}{3}\,cm$$

Nature – Virtual, erect .... 1, ½

$$h' = \frac{v}{u} \times h \quad = \left(\frac{-20}{3} \times \frac{1}{-20} \times 5 \right) cm = +\frac{5}{3}\,cm \qquad 1 \qquad 3$$

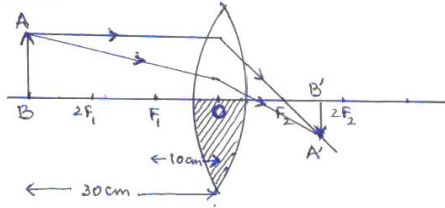|			
Q18.	Biodegradable substances – can be broken down into simpler substances by nature / decomposers/ bacteria/ saprophytes/ saprobionts.	½	
	Ex. – Human Excreta/ Vegetable peels, etc. (any one)	½	
	Non-biodegradable substances – can't be broken down into simpler substances by nature / decomposers.	½	
	Ex. – Plastic/ glass (or any other) (any one)	½	
	Habits:		
	- Use of separate dustbins for biodegradable and non biodegradable waste,		
	- Reuse of things such as poly-bags, etc.,		
	- Recycle of waste		
	- Use of cotton /jute bags for carrying vegetables etc.		
	(any two)	½ x 2	3
Q19.	• Ciliary muscles modify the curvature of the eye lens to enable the eye to focus objects at varying distances/ help in adjusting the focal length of the eye lens	1	
	• Presbyopia	½	
	• Bifocal lens	½	
	(a) Defect – Myopia/ Nearsightedness	½	
	Corrective lens – Concave/ Diverging lens	½	
	(b) Values – Concerned, Caring etc. (one value of teacher, one value of Salman)	½, ½	
	(c) By thanking the teacher and Salman	1	5
Q20.	• Power of lens:- Ability of a lens to converge or diverge the light rays falling on it/ The degree of convergence or divergence of light rays achieved by a lens/ Reciprocal of focal length of the lens.	1	
	• 1 dioptre – It is the power of a lens whose focal length is 1 metre.	½	
	• $f_A = +10\,cm = 0.1m$		
	Converging/ Convex lens	½	
	$P_A = \dfrac{1}{f_A} \quad = \dfrac{1}{+0.1m} = +10D$	½	
	$f_B = -10\,cm = -0.1m$		
	Diverging/ Concave lens	½	
	$P_B = \dfrac{1}{f_B} \quad = \dfrac{1}{-0.1m} = -10D$	½	
	• In this case the object will be between the optical centre and principal	½	

focus of the lens. Hence the convex lens, i.e., lens A will form virtual and magnified image of the object.

-

| | | 1 | 5 |

Q21.
- Yes   ½

-

(Note: image must be between F_2 and $2F_2$)   1 ½
- $h = 4$ cm $f = +20$ cm $u = -15$ cm $v = ?$ $h' = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$ ½

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{(+20)} + \frac{1}{(-15)} = \frac{3-4}{60} = \frac{-1}{60}$$

$\therefore v = -60$ cm   1

Nature – Virtual, erect   ½

$$h' = \frac{v}{u} \times h = \frac{-60\,cm}{-15\,cm} \times (+4\,cm) = +16\,cm$$ 1   5

Note: Problem can be solved through ray diagram also.

Q22.
a) When Mendel cross pollinated pure tall pea plants with pure dwarf pea plants, only tall plants were obtained in F1 generation. On self pollinating the F1 progeny, both tall and dwarf plants appeared in F2 generation in the ratio 3:1   1

Appearance of tall character in both the F1 and F2 shows that it is a dominant character. The absence of dwarf character in F1 generation and its reappearance in F2 shows dwarfness is the recessive character.   1

b) When Mendel conducted a dihybrid cross having two sets of characters, he obtained only one set of parental characters in F1 generation whereas in F2 generation he obtained both the set of parental characters now recombined in the ratio of 9:3:3:1.   1   1
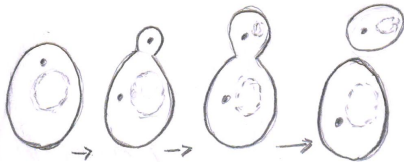
The appearance of new recombinants in the F2 generation along with parental type shows that traits are inherited independently.   1

Or

Flow chart with explanation.

| | | | 5 |

Q23.	a) Testis – secrete male hormone – testosterone	1
	Functions – i) formation of sperms,	
	ii) development of secondary sexual characters.	½ x 2
	b) i) fallopian tube / /oviduct.	
	ii) uterus.	½ x 2
	• Placenta is a special disc like tissue embedded in the mother's uterine wall and connected to the foetus / embryo.	1
	• Placenta provides a large surface area for glucose and oxygen/ nutrients to pass from the mother's blood to the embryo/ foetus.	1	5

Q24.	• Soaps are sodium or potassium salts of long chain carboxylic acids.	½
	• Detergents are ammonium or sulphonate salts.	½
	• Cleansing action of soap – One part of soap molecule is ionic / hydrophilic and dissolves in water. The other part is non-ionic / carbon chain / hydrophobic part which dissolves in oil.	1
	• Thus soap molecules arrange themselves in the form of a micelle / diagram of a micelle.	½
	On rinsing with water, soap is washed off, lifting the oily dirt particles with it.	½
	Soap does not form lather in hard water because of the reaction of soap with Ca and Mg ions present in hard water which forms insoluble ppt. / scum.	1
	Problems due to the use of detergents are:	
	• Detergents are non-biodegradable.	
	• It leads to water or soil pollution.	
	• It can also cause skin problems. **(any two)**	½ x2	5

SECTION – B

25) D	26) B	27) B
28) D	29) B	30) C
31) D	32) A	33) A	1x9 9

Q34.	Fine	1

		1	2

Q35.	• Carbon dioxide / CO_2.	1
	• Lime Water turns milky when CO_2 is passed through it. / A burning splinter gets extinguished by CO_2.	1	2

| Q36. | • Towards the lens | 1 | |
| | • Magnification decreases | 1 | 2 |